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ABSTRACT

Since 1970, 90 adopters in 67 universities have used EXPER SIM for teaching research design and strategy to college students through computer simulation. An analysis of EXPER SIM as an innovation revealed that implementation of the program was not necessarily retarded by its computer dependence. Administrative support seemed to be important in the adoption and implementation of the system. Frequently change or re-invention of the system itself occurred in the process of implementation as users adjusted the system to fit their needs. (CH)

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THE IMPACT OF EXPER SIM: THE DIFFUSION AND IMPLEMENTATION OF A TEACHING INNOVATION AMONG UNIVERSITY PROFESSORS

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ABSTRACT

"EXPER SIM" is an innovative system for teaching research design and strategy to college students through computer simulation. We analyze it as an innovation (an idea, practice, or object perceived as new by the individual or some other adopting unit) that has diffused, since its invention in 1970 to at least 90 adopters in 67 different U.S. universities. In addition, about 1,762 individuals have requested information about EXPER SIM as a step toward its possible adoption. One reason for the rapid diffusion of the innovation is its inclusion in the IMPACT program of the Exxon Education Foundation.

We deal here with two sub-processes of the innovation process: (1) initiation, which begins with a felt need that the innovation may meet, and that continues to the point at which a decision is made to adopt or reject the innovation, and (2) implementation, which begins with the decision to adopt an innovation, and continues through the steps involved in using the innovation, until the innovation is institutionalized to the point at which the idea loses its newness and has become an unrecognizable element in the adopting unit's ongoing operations.

Most past research focused on initiation, and ignored the implementation sub-process. EXPER SIM's implementation was not necessarily retarded by its computer dependence. A rather surprising degree of re-invention (the degree to which an innovation is changed in the process of implementation, after its original development) occurred, although not much discontinuance (only 5 of the 90 adopters have ceased using it).

THE IMPACT OF EXPER SIM: THE DIFFUSION AND IMPLEMENTATION OF A TEACHING INNOVATION AMONG UNIVERSITY PROFESSORS*

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> I say the educational sequence needs to be reordered -- that students in their first undergraduate laboratory class should begin to develop strategies for inferring models -- that they be introduced by data-collection techniques after they have begun to develop such strategies.
>
> (Dana Main, 1975)

The purpose of this paper is to describe (1) the diffusion of a teaching innovation to university professors, and (2) their implementation of this new idea. The innovation is "EXPER SIM", a new method of teaching experimental design to students. It was invented in the late 1960's, and in 1973, EXPER SIM was selected by the EXXON Education Foundation as one of four teaching/counseling innovations to be included in the Foundation's IMPACT program, aimed

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*The research reported in this paper was supported by the Exxon Education Foundation through grants in 1974-1975, and in 1975-1976.

at diffusing the innovations to a broad audience of university professors. The IMPACT program was launched in November, 1973, and by March, 1976 (27 months later), we estimated that there were at least 90 adopters of EXPER SIM located in 67 institutions throughout the United States* In addition, about 1,762 individuals requested information about the innovation, as a step toward its possible adoption. These data represent a rather rapid rate of diffusion of EXPER SIM.

In this paper, we shall briefly describe (1) the process of innovation, (2) the nature of EXPER SIM and the diffusion activities of the IMPACT program, (3) the results of this diffusion effort, and (4) the adoption and implementation of EXPER SIM by university professors.

Our theme through out the present paper is that EXPER SIM is an innovation (defined as an idea, practice, or object perceived as new by an individual or some other adopting unit), and that understanding of the diffusion and implementation of EXPER SIM can provide useful leads to the more general process of innovation and its diffusion and adoption in higher education.

THE PROCESS OF INNOVATION

The process of innovation has two distinct stages or subprocesses: (1) initiation, and (2) implementation (Rogers and Agarwala-Rogers, 1976; Zaltman and others, 1973) each of which have

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* The estimate of 90 adopters is based mainly on our data from the 1973-1974 requestors of information about EXPER SIM. There may be other adopters in addition to the 90, although we have utilized a variety of means to identify them.

various sub-aspects. These do not necessarily follow the precise order depicted in Figure 1. Initiation is the sub-process that begins with a felt need that the innovation may meet, and that continues to the point at which a decision is made to adopt or reject the innovation. Implementation is the sub-process that begins with the decision to adopt an innovation, and continues through the steps involved in using the innovation, until the innovation is institutionalized to the point at which the idea loses its newness and has become an unrecognizable element in the adopting unit's ongoing operations.

Most past research on the diffusion of innovations deals with the characteristics or factors associated with innovativeness (that is, being relatively early or late in adopting new ideas). Thus, we know a great deal about the nature of innovative schools, teachers, farmers, etc. But very little research has dealt with the process of innovation, the decision-making sequence over time through which a new idea is put into use.

Further, most past research on innovation stops with the decision to adopt (that is, with initiation), and ignores implementation (Fullan and Pomfret, 1975). Studies of the usual dependent variable of innovativeness tell us little about how an innovation is actually put into use, and to what consequences. A recent exception is the study of implementation of an innovation in a school by Gross and others (1971).

So the present research is distinctive in its focus on implementation. It also differs from most past diffusion research which look "backward" at the process after it had occured (through

I. INITIATION

1. Felt need
2. Knowledge of the innovation
3. Decision to adopt or reject

II. IMPLEMENTATION

1. Planning for adoption
2. Learning to use the innovation
3. Adapting the innovation to local conditions
4. Beginning actual use, or installation, of the innovation
5. Evaluation (1) of the degree to which an innovation meets the felt need, and (2) of its other condequences
6. Decision to continue using, or to discontinue, the innovation.
7. Institutionalization of the innovation into the ongoing activities of the adopter.

Figure 1. The Innovation Process Consists of the Sub-Processes of Initiation and Implementation.

the eyes of the adopter-respondents); our research seeks to study diffusion while it is underway.

EXPER SIM AND THE IMPACT PROGRAM

EXPER SIM("experimental simulation") is an innovative system for teaching research design and strategy to college students through computer simulation. It can provide an effective and economical alternative to many of the shortcomings and problems of the usual laboratory experience. EXPER SIM facilitates the teaching of research methods by enabling students to run experiments on a computer that has been programmed to generate relevant data. The computer replaces actual data-collection, thus saving time and eliminating the need for expensive laboratory space, equipment, and direction from teaching staff. Students are required to select appropriate experimental strategies, and to perform their own analyses of the data obtained from the computer.

EXPER SIM was originally developed to aid in teaching experimental psychology to graduate students. Building on the prior work of Dr. Richard R. Johnson, then at Earlham College, with "DATA-CALL", Professor Dana Main first developed EXPER SIM for teaching her students at the University of Michigan.*

Figure 2 depicts the evolution of EXPER SIM between 1968-1976. Considerable proliferation of the concept of experimental simulation

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* In September, 1975, Dr. Main became Associate Professor at the West Virginia College of Graduate Studies, Charleston, West Virginia.

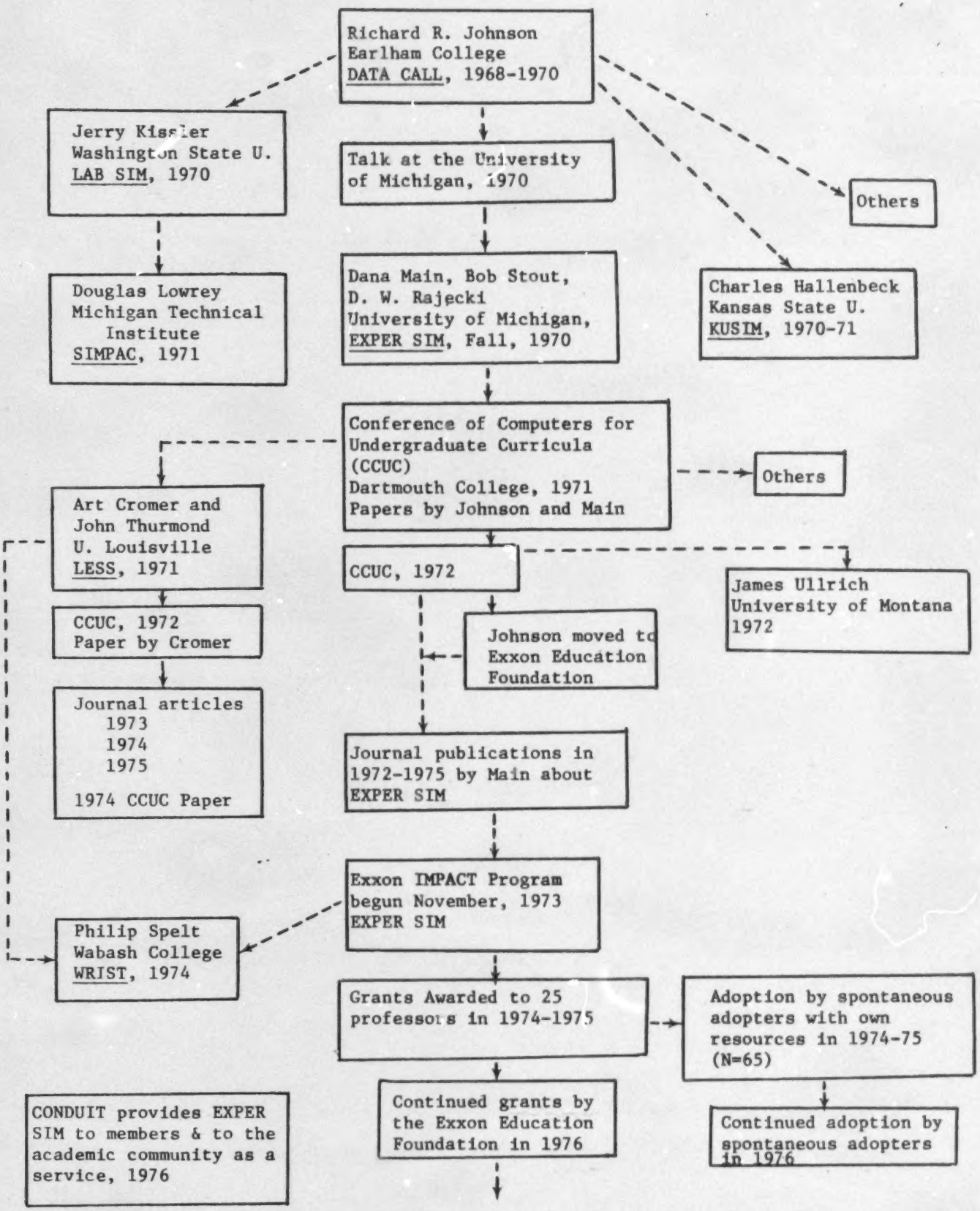

FIGURE 2. Evolution of the Idea of DATA CALL, EXPER SIM, and Their Various Off-Shoot Innovations.

has occurred: from the Johnson's DATA CALL to Main's EXPER SIM, to WRIST, and other models. All of these computer versions of experimental simulation have a great deal in common, and suggest a rather surprising extent of re-invention, a point which we detail later.

In early 1976, CONDUIT decided to disseminate EXPER SIM, which will help overcome some of the computer transportability difficulties that have occurred in the past

THE IMPACT PROGRAM

The IMPACT (Implementation of Materials and Procedures Affecting College Teaching) program was launched in November , 1973** by the Exxon Education Foundation. Prior to this time, the Foundation has made about 200 research and development grants to university faculty members to develop promising education innovations. By mid-1973 it was decided that four innovations had reached the point where they were ready for diffusion to university professors.***

The IMPACT program is aimed at improving the quality of teaching and learning in universities through innovation. In addition

*CONDUIT is a computer consortium headquartered in Iowa City. It presently has abut 100 member institutions. EXPER SIM will be distributed to the academic community in both the MESS (University of Michigan) and LESS (University of Louisville) versions.

**The other three innovations of the IMPACT program are: Guided Design-- a teaching method combining principles of programmed instruction with open-ended problem-solving; TIPS-- a diagnostic tool to individualize instruction in the large class; and Student-to-Student Counseling--a systematic approach to training students as academic counselors.

***In early 1976, two additional innovations were added to the IMPACT program.

it was hoped that IMPACT might provide insight into the general process of educational innovation in higher education.

Actually, some diffusion of EXPER SIM occurred prior to announcement of the IMPACT program. Figure 3 shows that 196 of our 680 respondents (29%) who knew about EXPER SIM by December, 1974 (when our data were gathered), had such awareness-knowledge prior to the initial announcement of the IMPACT program in November, 1973.

These 196 knowers mainly resulted from requests to the inventor (Dana Main) which had been motivated by her journal articles, papers at professional conferences, and other diffusion efforts. However, the launching of the IMPACT program speeded up the rate of awareness-knowledge of EXPER SIM. The initial mass mailing of 18,504 brochure packets by the Foundation to 6,168 selected individuals (who each received three sets of the packets with a request to pass them on the colleagues), followed by two other brochure mailings, were important in creating EXPER SIM.

By October, 1974, 892 individuals had requested information about EXPER SIM from the inventor. These requestors form an S-shaped curve over time, and interest in EXPER SIM seemed to be leveling off. But it took another spurt from November, 1974 to December, 1975, when an additional 870 individuals requested information about EXPER SIM, for a total of 1,762 requests.*

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* Unfortunately, we do know how many of these requests were received each month during the 14 months following October, 1974, so we are unable to plot the number of requests over time (as in Figure 3).

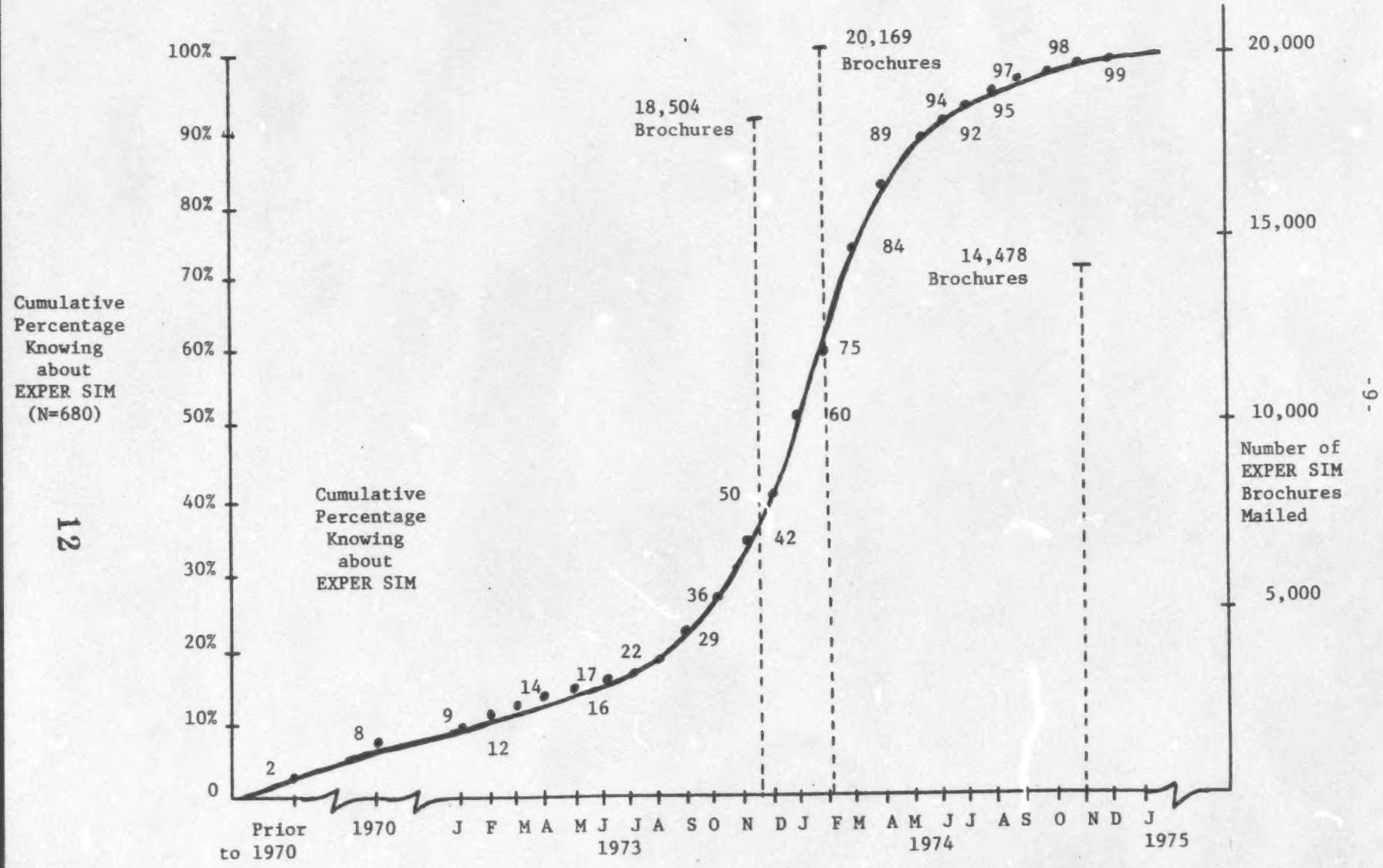

FIGURE 3. Knowing about EXPER SIM (as of December 1974) and the Number of IMPACT Brochures about EXPER SIM that were mailed.

In addition to this "direct" diffusion as a result of the IMPACT program, a considerable amount of spontaneous "secondary" diffusion has occurred to date. We estimate that the 1,762 requestors of EXPER SIM have interpersonally diffused the innovation to an additional 1,568 individuals. Most are colleagues in the requestor's department, or elsewhere in his/her institution, but a few are at other institutions.

We shall continue to monitor this secondary diffusion and the ensuing tertiary diffusion in the future, as EXPER SIM diffuses interpersonally through colleaguial networks.

The Exxon Education Foundation offers small grants to facilitate the implementation of EXPER SIM.

Proposal Deadline	Number of Proposals	Number of Grants
March, 1974	58	6
July, 1974	40	7
February, 1975	8	6
June, 1975	(Unknown)	6
Totals	--	25

In additional to these 25 grantee-adopters of EXPER SIM, there are 65 "spontaneous" adopters (that is, individuals who adopted the innovation without receiving a grant from the Exxon Education Foundation). Unfortunately, there does not seem to be a trend toward an

increasing number of spontaneous adopters, but our data may be inadequate on this point.

Number of Adopters	Grantees	Spontanteous Adopters	Totals
Prior to 1973	0	4	4
During 1974	13	37	50
During 1975	12	24	36
Until March, 1976	0	4	4
Totals	25	65	90

So to date, there are 90 adopters of the innovation.

EXPER SIM began as an instructional tool for teaching experimental design in psychology, and so the original instructional models all dealt with psychological phenomena (for example, industrial relations, imprinting, obesity, schizophrenia, etc.). Clearly, it was easier to adopt and use EXPER SIM if the adopter were a psychologist.

To what extent has the diffusion of EXPER SIM broken out of this disciplinary boundary? Table 1 shows that 24% of the grantees, 63% of the spontaneous adopters, and 52% of all adopters are psychologists.* There is no trend over time for EXPER SIM to be adopted by non-psychologists, but this may occur in the future as EXPER SIM teaching models become increasingly available in other disciplines.

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* About 21% of the information requestors of EXPER SIM are psychologists.

TABLE 1 Disciplinary Dissemination of EXPER SIM Among Adopters (N=90).

Disciplines	Number of Adopters: Grantees	Spontaneous Adopters	Totals
1. Psychology	6	41	47
2. Computer Science	0	8	8
3. Education	4	3	7
4. Engineering	4	1	5
5. Sociology	3	1	4
6. Chemistry	2	1	3
7. Mathematics	1	2	3
8. Political Science	1	2	3
9. Business	2	0	2
10. Nursing	1	1	2
11. Social Sciences	0	2	2
12. Biology	0	1	1
13. Communication	0	1	1
14. Geography	1	0	1
15. Physics	0	1	1
Totals	25	65	90

Table 2 illustrates the wide range in size (as measured by student enrollment) of the 67 institutions at which the 90 adopters are located.

THE INITIATION OF EXPER SIM

Previously we defined initiation as the sub-process that begins with a felt need that the innovation may meet, and that continues to the point which a decision is made to adopt or reject the innovation. Our present data only deals with two aspects of the initiation of EXPER SIM: Reasons for requesting information, and the characteristics of the requestors.

Most information requestors initiated the process for adopting EXPER SIM because (1) of potential utility of the innovation (51%), and (2) information-seeking and curiousity about EXPER SIM (7%) (Table 3). Relatively few requestors were motivated by the possibility of making a grant proposal.

Most requestors are located at public-state supported colleges (52%). The student enrollment ranged from 1,000 to 9,999 in 90% of the cases. The requestors' institutions provided doctoral degrees in 36% of the cases; masters' and specialist degrees in 31% of the cases, and a bachelors' degree (18%); the remaining 15% provide two years of education. Other characteristics of the information requestors are summarized in Table 4.

TABLE 2. Institutions Where EXPER SIM Was Adapted.

Institution	State
1. Augustana College	Illinois
2. University of Bridgeport	Connecticut
3. Clarke College	Iowa
4. Clarkson College of Technology	New York
5. College of Charleston	South Carolina
6. University of Colorado	Colorado
7. Cooper Union	New York
8. Columbia University	New York
9. University of Dayton	Ohio
10. University of Denver	Colorado
11. Eastern Kentucky University	Kentucky
12. Eastern Michigan University	Michigan
13. Edinboro College	Pennsylvania
14. Elizabethtown College	Pennsylvania
15. Emporia Kansas State College	Kansas
16. University of Houston	Texas
17. Florida International University	Florida
18. Florida State University	Florida
19. Florida Technological University	Florida
20. Franklin and Marshall College	Pennsylvania
21. George Washington University	Washington, D.C.
22. Guilford College	North Carolina
23. University of Illinois	Illinois
24. Illinois State University	Illinois
25. Indiana University	Indiana
26. University of Iowa	Iowa
27. Jackson County Community College	Michigan
28. Johns Hopkins University	Maryland
29. Lindenwood Colleges	Missouri
30. Los Angeles Baptist College	California
31. University of Louisville	Kentucky
32. Maricopa County Community College	Arizona
33. Miles College	Alabama
34. University of Michigan	Michigan
35. University of Michigan-Flint	Michigan
36. Michigan State University	Michigan
37. Michigan Technological University	Michigan
38. Macalaster College	Minnesota
39. University of Montana	Montana
40. Nassau Community College	New York

(Table 2. Continued)

41.	New Mexico Highlands University	New Mexico
42.	New Mexico State University	New Mexico
43.	New York University (CUNY)	New York
44.	University of North Carolina-Ashville	North Carolina
45.	University of North Carolina-Chapel Hill	North Carolina
46.	University of North Carolina-Greensboro	North Carolina
47.	North Carolina Central University	North Carolina
48.	North Carolina State University	North Carolina
49.	Northwestern University	Illinois
50.	Ohio State Univeristy	Ohio
51.	University of Oregon	Oregon
52.	Oregon State University	Oregon
53.	Otterbein College	Ohio
54.	Rhode Island Community College	Rhode Island
55.	University of San Francisco	California
56.	Scottsdale County Community College	Arizona
57.	Seattle Pacific College	Arizona
58.	University of the South	Tennessee
59.	University of South Alabama	Alabama
60.	Stanford University	California
61.	Sweet Briar College	Virginia
62.	Syracuse University	New York
63.	St. Andreas Presbyterian College	North Carolina
64.	Tuskegee Institute	Alabama
65.	Vanderbilt University	Tennessee
66.	Wabash College	Indiana
67.	University of Wisconsin	Wisconsin

TABLE 3. Most Important Reasons for Requesting Information about EXPER SIM (N=778).

Reasons Mentioned	Number of Responding Requests	Percent of Responding Requests
I. Potential Utility in Teaching	398	51%
1. Will improve teaching effectiveness	(107)	(14%)
2. Will help develop course materials	(25)	(3%)
3. To compare with "my own innovation" and/or to incorporate into "my own innovation"	(39)	(5%)
4. Want to use in the course as it seems promising	(201)	(26%)
5. Use it for helping the institution's pressing problems (e.g., open admission)	(15)	(2%)
6. To stimulate students' interest	(11)	(1%)
II. Informational Search	273	35%
7. To find out more details about the innovation	(145)	(18%)
8. Curiousity	(52)	(7%)
9. General interest in teaching/ counseling innovations	(67)	(9%)
10. Collecting it for the institution's library and/or grant office	(9)	(1%)
III.(11) To Make a Grant Proposal to the Exxon Education Foundation	52	7%

(Table 3. Continued)

IV.	Other Reasons	56	7%	
	12. Suggested by others to request	(38)	(5%)	
	13. Help make more efficient use of resources	(14)	(2%)	
	14. For use of others who are members of the computer consortium or network	(3)	(-)	
	Total number of reasons given by the responding requests	778	100%	

TABLE 4. Characteristics of the Information Requestors of EXPER SIM (N=760).

Characteristics	Averages or Percentages (and number of respondents on which it is based)*
1. Age in years	X = 39 (N=618)
2. Percentage who are male	87% (N=742)
3. Percentage with a doctorate degree	77% (N=653)
4. Years at the present institution	X = 6.4 (N=734)
5. Percentage who have used computers for both research and teaching	67% (N=712)
6. Weight given to teaching in the perceived reward structure (out of 100 points allocated to teaching versus research and publication)	67 (N=595)
7. Percentage who are administrators (department chairman, dean, vice president, president, etc.)	46% (N=684)
8. Percentage who are full professors	8% (N=684)
9. Average number of students enrolled in the individuals institution	9,331 (N=729)
10. Gourman (1967) academic ranking of the individual's institution (the possible range is from about 200 to 800)	400 (N=558)

* Which is somewhat different for each characteristic, due to missing data.

THE IMPLEMENTATION OF EXPER SIM

Implementation is the sub-process that begins with the decision to adopt an innovation, and continues through the steps involved in using the innovation, until the innovation is institutionalized to the point at which the idea loses its newness and has become an unrecognizable element in the adopting unit's ongoing operation. In the present study, we investigated such aspects of implementation as the characteristics of adopters, computer-related aspects of use, re-invention, and discontinuance.

Characteristics of Adopters

The average adopter of EXPER SIM is 40 years old. The typical adopter is an assistant professor (31%), at a public-state supported institution, that awards the doctoral degree (37%). About 80 percent of the adopters hold a doctoral degree. Ten percent of the adopters are females, and 66 percent have used computers for both research and teaching prior to their experience with EXPER SIM.

Computer-Related Issues in the Adoption of EXPER SIM

We expected that the computer-dependence of EXPER SIM might be a retarding influence on its rate of adoption. Table 5 shows that computer-related reasons were not listed by many of the information requestors. In addition to the 12 percent of these respondents who mention the lack of trained personnel (including computer programmers), the following reasons were mentioned by at least 4 or more percent of

TABLE 5. Information Requestors' Reasons for Non-Adoption of EXPER SIM.

Reasons Given for Non-Adoption	Number of Reasons Mentioned	Percentage of All Reasons Mentioned
1. Unavailability of funds to adopt	227	23%
2. Overly time-consuming or lack of release time	191	19%
3. Unavailability of trained personnel (e.g., teaching assistant, computer-programmer, etc.) to implement the innovation	121	12%
4. Have not had adequate time to make a decision as to whether to adopt	57	6%
5. Does not fit the subject matter of the respondent's courses	78	8%
6. Lack of support from administrators	37	4%
7. Collected information for others (the respondent is not in a position to adopt)	51	5%
8. Lack of interest in EXPER SIM	16	1%
9. Have a modified or comparable innovation in use	24	2%
10. Other reasons	202	20%
Total number of reasons given	1,004	100%

* These 1,004 reasons were mentioned by 760 information requestors of EXPER SIM.

the responding requests (under "other reasons" in Table 5).

1. Lack of a transferable computer program for implementing EXPER SIM.
2. Doubts about the usefulness of a computer-assisted instructional approach.
3. Students' negative attitudes toward computers.

Adopters of EXPER SIM were twice as likely to have previously used some form of computer-assisted instruction as were the adopters of the two non-computer innovations in the IMPACT program. Also, we previously showed that 66 percent of the 90 adopters had used computers previously for teaching and research. Thus, we feel that the lack of prior computer experience did not seem to be a very important barrier to the adoption and implementation of EXPER SIM.

However, such variables as computer compatability, computer languages, and the unavailability of computers or funds for their use, etc. might deter adoption.

Table 6 shows that 43% of the adopters of EXPER SIM have computers in the IBM 360 or 370 series (similar to the computer on which EXPER SIM was first developed). However, the innovation has also been implemented on a wide range of other computers, including some of a relatively smaller size. The University of Louisville LESS version of EXPER SIM has been implemented on several small sized computers in recent years.

TABLE 6. Computers on Which EXPER SIM Is Currently Being Used.

Computer	Number of Users
1. IBM 370 Series	24
2. IBM 360 Series	10
3. DEC 10	7
4. CDC 6400	5
5. PDP 11/45	5
6. CDC CYBER 73	4
7. Hewlett Packard 2000F	4
8. UNIVAC 1106	3
9. CDC 6600	2
10. Burroughs 6700	2
11. Burroughs 4700	1
12. CDC 3300	1
13. CDC 6500	1
14. General Automation 1800	1
15. Honeywell 1642	1
16. Honeywell 2040	1
17. Hewlett Packard 2000E	1
18. PDP 11/40	1
19. RCA Spectra 70/46	1
20. UNIVAC 70/46	1
21. UNIVAC 1100	1
22. UNIVAC 7007	1
23. XEROX Sigma 7	1
Total	79

From the 90 adopters of EXPER SIM to date, we have obtained data on 76 adopters and their computers on which EXPER SIM is installed. Of the 76 adopters, three are using both LESS and MESS on two different computers.

Thus we conclude that computer compatability did not necessarily retard the implementation of EXPER SIM.

Administrative support seemed to be important in the adoption and implementation of EXPER SIM. A majority of the adopters felt that without the support of their administrators, it would have been difficult to provide faculty release time, computer funds, and/or other resources to the adopter.

Re-Invention

Re-invention is the degree to which an innovation is changed in the process of implementation, after its original development.

The basic idea of EXPER SIM was kept essentially intact, in the case of many adopters, but they renamed the innovation, or the computer program was modified, or new teaching models were created, or EXPER SIM was utilized in a special way in a course.

Why does re-invention of EXPER SIM occur? Some adopters may have a "prima donna" complex in insisting that EXPER SIM is their own invention an attitude perhaps motivated by a certain local pride that is involved in calling an innovation by a name that gives it local identity. Many times, as we noted previously, machine-related issues necessitate some modification of EXPER SIM to suit the local needs.

We are collecting further data on the issue of re-invention, as one aspect in the sub-process of implementation of EXPER SIM.

Discontinuance

Discontinuance is the decision to cease use of an innovation, after previously adopting it. We find that only 5 individuals (all are spontaneous adopters) have discontinued using EXPER SIM to date. In all three cases, a financial crunch in the institution led to the discontinuance; causes of the other two discontinuances are as yet unknown.

Several of the adopters have evaluation researches underway on the effectiveness of EXPER SIM, but to date we have only been able to obtain publications from five such evaluations.

CONCLUSIONS

We summarize the results of the present investigation as follows:

1. There has been a rather rapid rate of diffusion of EXPER SIM since its invention and development in 1970, and its inclusion in the IMPACT diffusion program in 1973: By March, 1976, there were (1) at least 90 adoptors of the innovation, and (2) 1,762 information requestors.

2. The widespread mailing to U.S. university personnel of an IMPACT brochure about EXPER SIM helped to create awareness-knowledge of the innovation, and to motivate individuals to request information about EXPER SIM from the inventor.

3. The estimated 1,762 information requestors about EXPER SIM have interpersonally diffused the innovation to an additional 1,568 colleagues, most of whom are in the same department or in the same

institution. Such secondary diffusion, in turn, is presently leading to an interpersonal tertiary diffusion.

4. The 25 grantee-adopters of EXPER SIM differ from the 65 spontaneous (non-grantee) adopters in that the grantees are less likely to be psychologists; thus, the IMPACT progress grants are especially important in helping the innovation break outside of the original discipline of the inventor.

5. The number of grantee-adopters is about 13 per year, and the number of spontaneous adopters does not seem to be increasing in more recent time periods.

6. Most individuals are motivated to request information about EXPER SIM by the perceived potential utility of the innovation as a teaching tool, rather than by the possibility of making a grant proposal to the IMPACT program.

7. The adopters of EXPER SIM are not widely different in their personal and institutional characteristics from the information requestors.

8. Lack of prior computer experience did not seem to be a very important barrier to the adoption and implementation of EXPER SIM, nor did problems of computer compatability (although the innovation was originally available for relatively larger computers, it is now also up on smaller computers).

9. A rather surprising degree of re-invention has occurred in the case of EXPER SIM.

10. Only 5 of the 90 adopters of EXPER SIM have discontinued its use.

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